PATENT ABSTRACTS OF JAPAN

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(54) METHOD FOR IDENTIFYIivG ACTIVE HANDSET IN CORDLESS TELEPHONE SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To provide the method and device for identifying an active handset in a cordless telephone system.

SOLUTION: The user uses a handset of a base station or a user interface to enter an inquiry (204). The base station conducts a ping operation, that is, makes inquiry about generation of a list of active handsets with respect to each of registered handsets (210). Then the list of the active handsets is sent to a handset from which an inquiry therefrom is received (228) or displayed by using a user interface of the base station. Thus, the user recognizes which of the other users are registered to the base station as active handsets for the purpose of a call transfer, an intercom or use of other convenient functions for the user.
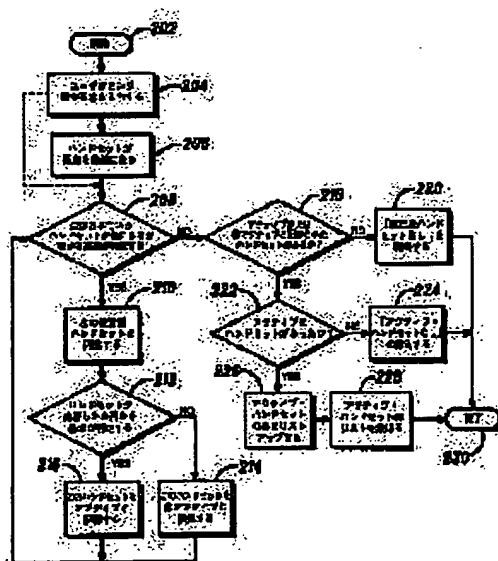
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CLAIMS

[Claim(s)]
[Claim 1] In a cordless telephones system equipped with a base station and two or more hand sets set up
so that said base station and radio might be performed In said base station the approach of identifying an
active hand set -- it is -- : -- phase (204); which transmits enquiry from the 1st hand set (104) to said
base station (102) -- The approach characterized by being constituted by phase (228); which transmits
phase (226); which creates the list of active hand sets, and said active hand-set list to said 1st hand set.
[Claim 2] The phase where of said base station maintains the list of registered hand sets, and said
approach transmits a hand-set question to each hand set on the :aforementioned active hand-set list
(210); the approach according to claim 1 characterized by to be further constituted by phase; which
includes only the hand set with which the response from it was received in phase (212); which detects
the response to said hand-set question, and said active hand-set list.
[Claim 3] The approach according to claim 2 characterized by being further constituted by phase (220);
which transmits a registration-less signal to said 1st hand set when there is no hand set registered into
phase (208); which judges whether there is any hand set registered into said base station, and said base
station.
[Claim 4] The phase where of said phase judge whether there is any hand set registered into said base
station transmits a hand-set question to each hand set on the :aforementioned active hand-set list; the
approach according to claim 3 characterized by to be constituted by phase (214); which records each
hand set which does not answer phase (216); which records each hand set which answers said hand-set
question as it is active, and said hand-set question as it is inactive.
[Claim 5] Said approach: The approach according to claim 4 characterized by answering phase (224);
which transmits an active-less signal to said 1st hand set, and said active-less signal, and being further
constituted by phase; which generates a notice to said 1st hand set when there is no hand set recorded as
it is active and it is recorded that one or more hand sets are inactive.
[Claim 6] The approach according to claim 3 characterized by being further constituted by the phase
which said 1st hand set is equipped with a display, and said approach answers said registration-less
signal, and generates a notice on said display.
[Claim 7] The approach according to claim 1 characterized by being further constituted by the phase
where said 1st hand set is equipped with a display, and said approach displays said active hand-set list
on said display.
[Claim 8] The phase where of said base station is equipped with a keypad and a display, and said
approach inputs local enquiry using the :aforementioned keypad (204); the approach according to claim
1 characterized by to answer phase (226); which answers said local enquiry and creates said active hand-
set list, and said active hand-set list, and to be further constituted by phase (228); which displays the
display list of an active hand set on said display.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] Generally this invention relates to a cordless telephones system. This invention relates to the approach of identifying an active hand set in a cordless telephones system, in more detail.
[0002]
[Description of the Prior Art] A present-day cordless telephones system corresponds to two or more hand sets (handset) which coordinate with one base station and operate. A base station is combined with a wire telephone network. A base station is equipped also with the wireless circuitry for communicating with a cordless hand set. A hand set is equipped with the same wireless circuitry for communicating with a base station. There are a system which operates in accordance with digital Europe cordless telephone (DECT) criteria as an example of such a cordless telephones system, and a system which operates by the Japanese personal handicap phon (PHS) system.
[0003] These systems provide the user using this multiplex hand-set function with much functions to give facilities. For example, a system supports the call from a hand set to a hand set, the call transfer between hand sets, paging between hand sets, or the intercom function between hand sets. It may realize, using a base station as a common communication link, or these functions may be realized using the direct communication between hand sets. These functions can be used in the system which uses a base station as a handsfree loudspeaker phon, or is equipped with the hand set with a code for the communication link between a base station and a hand set of a base station.
[0004] One of the troubles at the time of using a function convenient for such a user is not knowing which user or which hand set is actively registered into the base. For example, the user who answers an incoming call needs to know whether the user to whom the call is addressed can catch actively in a system, before transmitting a call. Similarly, a user may judge first whether other users are registered actively before intercom actuation. However, there is such no function in a current cordless telephones system.
[0005] Therefore, the cordless telephones system which can identify an active hand set is required in this technique before the communication link between hand sets, or the communication link between a hand set and a base station.
[0006]
[Example] Drawing 1 is referred to and a cordless telephones system 100 is equipped with a base station 102 and two or more hand sets, such as a hand set 104, a hand set 106, a hand set 108, a hand set 110, and a hand set 112. A cordless telephones system 100 can be equipped with the hand set of the number of arbitration, and the number illustrated by drawing 1 is chosen as arbitration in order to show one example of such a system. A cordless telephones system 100 is built for the radio between a base station 102 and each of two or more hand sets. Radio is performed according to a standard protocol. As an example of such a standard protocol, there is a digital Europe cordless telephone (DECT: Digital European Cordless Telephone) protocol or a personal handicap phon system (PHS: Personal Handy Phone System) protocol. A base station 102 serves as an interface between radio with two or more hand

sets, and a wire communication with a telephone network. A base station 102 is equipped with the cable interface 114, a controller 116, memory 118, a user interface 120, the receiver circuit 122, a transmitter circuit 124, the antenna switch 126, and an antenna 128. The cable interface 114 is combined with the input 130 built so that it may combine with a telephone network. The cable interface 114 offers functions, such as tone generation for a duplex tone multi-frequency (DTMF: dual tone and multi-frequency) dial, or detection of the incoming call appearance signal from a telephone network. The cable interface 114 communicates the signal showing voice between a telephone network and a controller 116 again.

[0007] A controller 116 controls actuation of a base station 102. A controller 116 is the suitable processor or microcontroller of arbitration. A controller 116 answers the data of the instruction which memorizes data in memory 118 and is memorized in memory 118, and operates. A base station 102 is equipped with many control connections combined with a controller 116 and other elements of a base station 102. Not all of these control connections are illustrated by drawing 1 so that a drawing may not become not much complicated.

[0008] A user interface 120 is equipped with a display 132, a keypad 134, a loudspeaker 136, and a microphone 138. Displays 132 are suitable displays of arbitration, such as a liquid crystal display (LCD) or a light emitting diode (LED) display. A keypad 134 may be equipped with the standard keypad for a telephone, and may be similarly equipped with other function keys. A user interface 120 operates the base as a handsfree loudspeaker phon using a loudspeaker 136 and a microphone 136, and performs the dial and actuation of a base station 102 using a display 132 and a keypad 134. Depending on an application, or a base station 102 is more cheap, it may omit a user interface 120 in a low level cordless telephone model, for example.

[0009] The receiver circuit 122 and a transmitter circuit 124 perform radio with one or more hand sets among a base station and two or more hand sets. At the time of reception of a radio frequency (RF) signal, a base station 102 receives a RF signal through an antenna 128. An antenna 128 changes a RF signal into electric baseband signaling. The receiver circuit 122 restores to electric baseband signaling, recovers the data transmitted on a RF signal, and generates a serial-data stream. This serial-data stream is changed into clock-ed data, and is sent to a controller 116. A user interface 120 uses data or a controller 116 formats them into the voice or information which is transmitted to the cable interface 114 and which can be recognized. A user interface 120 communicates receipt information-ed or voice to a user. Similarly, the cable interface 114 communicates receipt information-ed or voice to a telephone network.

[0010] If a radio frequency (RF) signal is transmitted from a base station 102, a controller 116 will receive user input data from a user interface 120, and will receive cable information from the cable interface 1114. A controller 116 formats the information acquired from the user interface 120, tells it to a transmitter circuit 124, and changes it into the RF signal become irregular. A transmitter circuit 124 tells the RF signal become irregular to an antenna 128, and transmits it to a base station 102. The antenna switch 126 combines alternatively either the receiver circuit 122 or the transmitter circuit 124 with an antenna 128.

[0011] Each hand set is equipped with the same wireless circuitry for communicating with a base station 102 among two or more hand sets. The structure of a hand set and actuation relevant to a base station 102 are explained using a hand set 104 as an example. However, the hand set 106, the hand set 108, the hand set 110, and the hand set 112 are substantially [it is desirable and / as a hand set 104] the same.

[0012] A hand set 104 is equipped with an antenna 152, the antenna switch 154, the receiver circuit 156, a transmitter circuit 158, a controller 160, memory 162, and a user interface 164. At the time of reception of the RF signal from a base station 102, a hand set 104 receives a RF signal through an antenna 152. An antenna 152 changes a RF signal into electric baseband signaling. The receiver circuit 156 restores to electric baseband signaling, recovers the data transmitted on a RF signal, and sends clock-ed data to a controller 160. A controller 160 is formatted into the voice or information which can be recognized that a user interface 164 uses data. A user interface 164 communicates receipt information-ed or voice to a user.

[0013] A user interface 164 is equipped with a loudspeaker 166, a microphone 168, a keypad 170, and a display 172. A keypad 170 may be equipped with the standard keypad for a telephone, and may be similarly equipped with other function keys. Preferably, although a display is a multiplex circuit liquid crystal display (LCD), it can also be considered as suitable displays of arbitration, such as a light emitting diode (LED) display. A display may be equipped with other visual displays, such as an LED display which emits light alternatively, in order to give a user information.

[0014] If a radio frequency (RF) signal is transmitted to a base station 102 from a hand set 104, a user interface 164 will transmit user input data to a controller 160. A controller 160 formats the information acquired from the user interface 164, transmits it to a transmitter circuit 158, and changes it into the RF signal become irregular. A transmitter circuit 158 tells the RF signal become irregular to an antenna 152, and transmits it to a base station 102.

[0015] Drawing 2 is the flow chart showing actuation of the cordless telephones system 100 of drawing 1 by this invention. This method of identifying an active hand set within a cordless telephones system starts in a phase 202. In a phase 204, a user inputs a ping enquiry demand. Here, a ping (ping) points out the process in which it judges which other hand sets are actively registered into the base station now, and the enquiry is called local enquiry. A user inputs ping enquiry using the keypad 134 of a base station 102 (drawing 1). In this case, activation follows a phase 208. Or a user may input ping enquiry using the keypad 170 of the 1st hand set, such as a hand set 104. In this case, activation transmits enquiry to a base station from the 1st hand set following a phase 206 at this time, and the phase of receiving enquiry from the 1st hand set is included. Activation follows a phase 208.

[0016] In a phase 208, an approach enters a loop formation including the phases 208 and 210,212,214,216 which create the list of active hand sets in a base station. Within this loop formation, a hand-set question is transmitted to each hand set on the list of registered hand sets, the response to a hand-set question is detected to this approach, and the phase of putting in only the hand set with which the response was received on the list of active hand sets is included in it.

[0017] A hand set is registered to the base station actively [whenever it comes within the limits of a base station, or whenever a hand set is turned on within the limits of a base station]. A base station 102 maintains the list of registered hand sets in memory 118 (drawing 1). By registering, it can pursue whether which hand set of a base station is available to reception of an incoming call. A radio frequency and time amount slot allocation are also performed about the communication link between a base station and a hand set by this registration process.

[0018] In a phase 208, it judges whether a base station has the hand set registered into the base station. When the hand set is not registered into a base station, activation follows a phase 218. This is explained in full detail below. When the hand set is not registered into a base station, the trial of a phase 218 is finished with failure and it reports that a base station does not have the hand set registered in a phase 220. From the 1st hand set, when ping enquiry is received, a base station transmits a registration-less signal to the 1st hand set. When the 1st hand set possesses the display of the display 172 of a hand set 104 (drawing 1) etc., the registration-less signal received from the base station is answered, and the phase of performing a registration-less notice on a display is included in this approach. this notice -- for example, LCD and LED The text messages displayed on the display, or lighting LED it is .

[0019] When one or more hand sets are registered into the base station, a base station transmits a hand-set question to each hand set on the list of registered hand sets. After transmitting a hand-set question to a certain hand set, a base station detects the response to the question in a phase 210. A hand-set question and its response are the radio of the suitable gestalt of the arbitration between the base stations and hand sets using the suitable protocol of arbitration. A hand set receiving and recognizing a hand-set question, answering it, and preparing and transmitting a response is needed. This response serves as a notice to the base station which shows that a hand set is active. Here, the power source is turned on and an active hand set points out the hand set in radio within the limits of a base station.

[0020] In a phase 212, a base station judges whether the hand set answered the hand-set question. A base station waits to receive predetermined time amount and a response. One of the possible predetermined time is a two-frame period, when a base station and a hand set communicate using the Time-Division-

Multiplexing connection protocol with which radio is performed by the predetermined time frame. If a two-frame period is used, a hand set can receive a hand-set question and can transmit a response.

[0021] When a base station does not receive a response, in a phase 214, a base station records each hand set which does not answer a hand-set question as it is inactive. When a base station receives a response, in a phase 216, a base station records each hand set which answers a hand-set question as it is active.

[0022] It judges whether control has return and the hand set registered in a phase 208 else. When one or more additional hand sets are contained in the list of registered hand sets, a loop formation including a phase 210,212,214,216 is repeated until a base station transmits a hand-set question to all registered hand sets and records them as an active hand set or an inactive hand set. Processing of all hand sets judges whether there is any hand set recorded as it is active or inactive in a phase 218. When there is a registered hand set, this condition serves as truth and activation goes to a phase 222. When there is no registered hand set, as mentioned above, conditions do not serve as truth but activation goes to a phase 220 in this case.

[0023] In a phase 222, it judges whether there is any hand set recorded as a base station is active. When there is nothing, it is shown that this did not answer a hand-set question although at least one hand set was registered into the base station. When the hand set is off or it is out of range [a base station], this condition may happen. When there is no hand set recorded as it is active and it is recorded that one or more hand sets are inactive, it is reported that a base station does not have an active hand set in a phase 224. When ping enquiry is received from the 1st hand set, a base station transmits an active-less signal to the 1st hand set. Answering an active-less signal, the 1st hand set generates notice that there is no active hand set on the display. this -- LCD Or LED The text messages or turned-on LED on a hand set it is . If it is not recorded that a hand set is active when ping enquiry is inputted using the keypad 134 of a base station 102 (drawing 1), a base station will perform an active-less notice. A base station is the text messages or Lighting LED which shows that there is no active hand set on the display. Or other notices are generated.

[0024] If a base station judges in a phase 222 what was recorded as one or more hand sets are active, control will go to a phase 226. Here, a base station creates the list of active hand sets. The list of active hand sets is maintained in the memory 118 of a base station 102 (drawing 1). In a phase 228, a base station notifies an active hand set using the list of this active hand set. If ping enquiry is received from one hand set, a base station will transmit the signal which shows the list of active hand sets, or the list of active hand sets to the 1st hand set. When the 1st hand set is equipped with the display of the display 172 of a hand set 104 (drawing 1) etc., a hand set is displayed on a display of the list of active hand sets in a phase 224. For example, this list may be a list of other specifiers with semantics for a hand-set identification number or a user. Or other hand sets in a system are assigned, and also this list may be a list of user names. When a keypad and a display are included in a base station and ping enquiry is inputted using the keypad of a base station, a base station is a phase 224, answers the notice of an active hand set and displays the display list of an active hand set on a display. Then, this approach is ended in a phase 230.

[0025] This invention offers the approach and equipment which notify the active hand set in a cordless telephones system so that the above may show. A user inputs ping enquiry using either of the user interfaces of a hand set or a base station. To each registered hand set, it ping-operates, namely, refers for a base station so that the list of active hand sets may be created. Then, it is transmitted to the hand set with which ping enquiry was received from there, or the list of active hand sets is displayed using the user interface of a base station. Thereby, a user can know other users of which are actively registered into the base station 102, in order to perform call transfer and intercom actuation, or in order to use a function convenient for the user of others of a cordless telephones system.

[0026] It is correctable although the specific example of this invention was illustrated and explained. For example, the phase which records an inactive hand set is omitted, and active and when a response of as opposed to a hand-set question for the list of active hand sets is received, it can also create. Moreover, this approach can be extended to the cordless telephones system using the public base station which communicates with other public base stations, and can also perform the hand off of an active telephone

call. Therefore, an attached claim includes all modification and correction of these included in the pneuma and the range of this invention.

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TECHNICAL FIELD

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* NOTICES *

TECHNICAL PROBLEM

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a wire telephone network. A base station is equipped also with the wireless circuitry for communicating
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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram of a cordless telephones system of operation using this invention.
[Drawing 2] It is the flow chart showing actuation of the cordless telephones system of drawing 1 by this invention.
[Description of Notations]
202 Initiation
204 User Inputs Ping Enquiry Demand.
206 Hand Set Sends Enquiry to Base.
208 Base Judges whether There is Another Hand Set Registered.
210 Refer for the Following Registered Hand Set.
212 Base Judges whether Hand Set Answered.
214 Record this Hand Set as it is Inactive.
216 Record this Hand Set as it is Active.
218 Is There a Hand Set Recorded as it is Active or Inactive?
220 Report "He Has No Registered Hand Set."
222 Was There an Active Hand Set?
224 Report "He Has No Active Hand Set."
226 List Only Active Hand Set.
228 Prepare List of Active Hand Sets.
230 Termination

[Translation done.]

* NOTICES *

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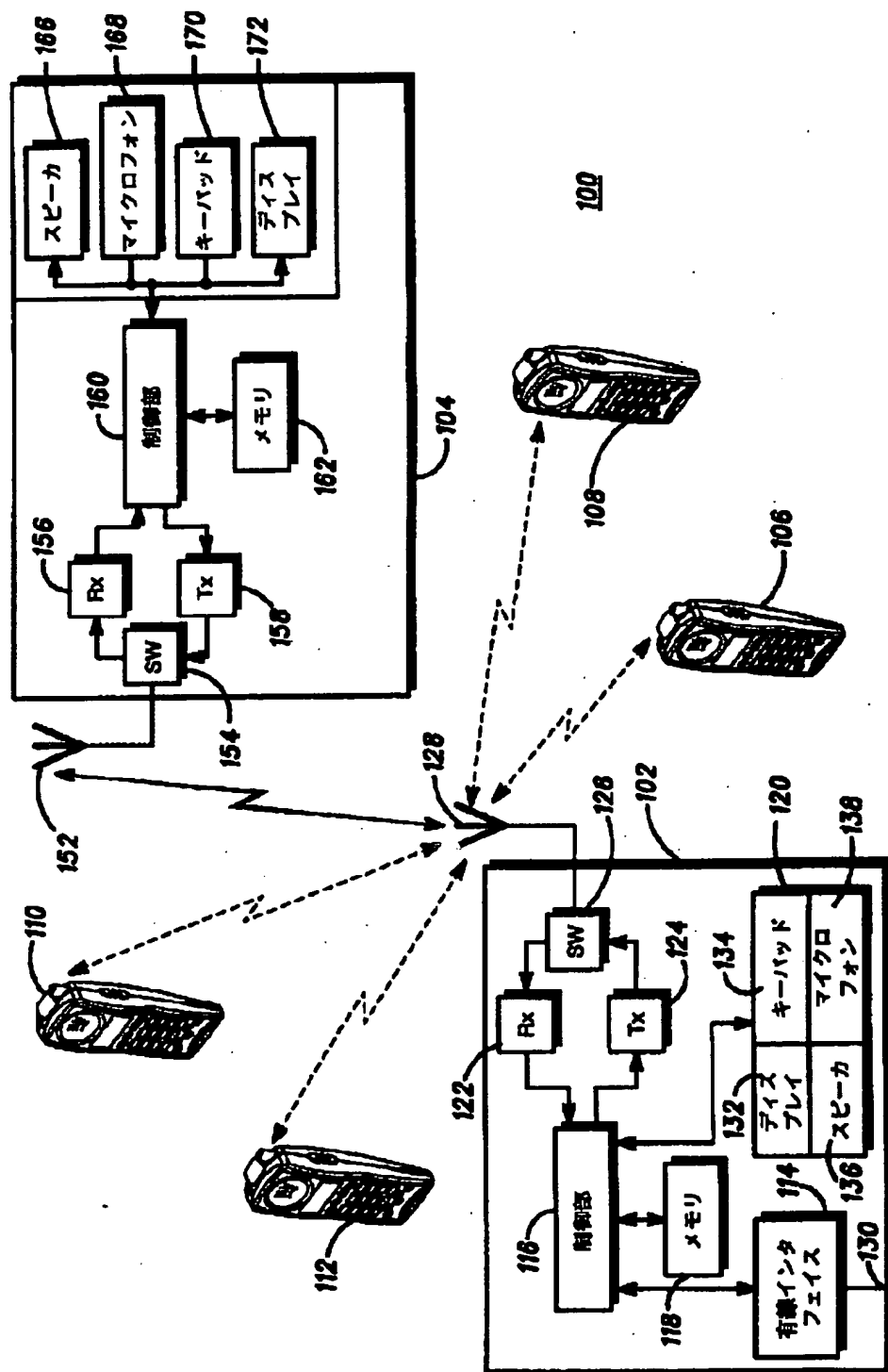**damages caused by the use of this translation.**

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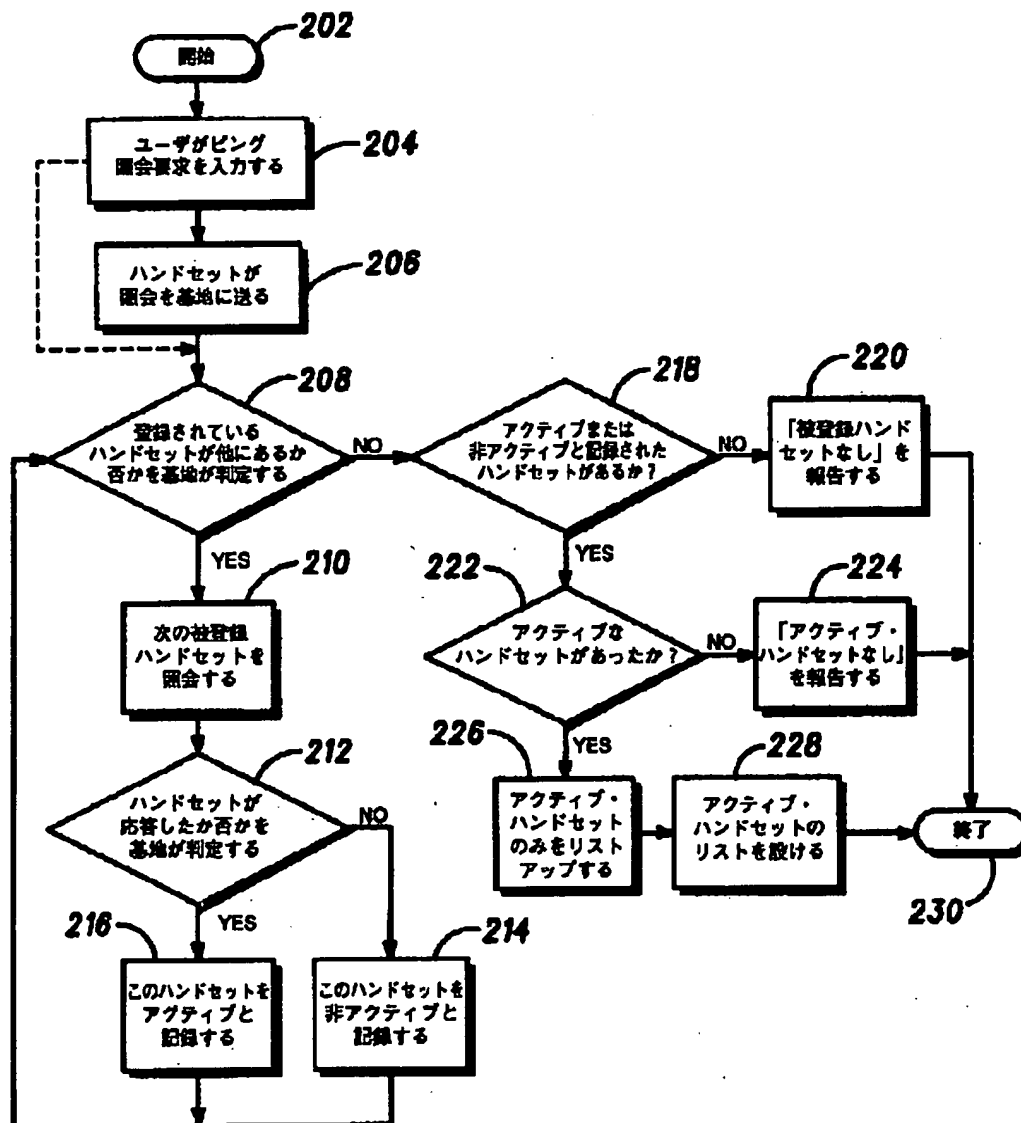3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]

[Drawing 2]

[Translation done.]